

What is claimed is:

1. A defect inspection apparatus for inspecting pattern on an object, comprising:  
an image pickup device for performing an image pickup of an object to acquire  
5 data of an inspection image which is multitone;  
a memory for storing data of a reference image; and  
an operation part for obtaining transfer characteristics to enhance difference  
between arbitrary pixels among a plurality of specified pixel values which are specified in  
defect detection and then obtaining an enhanced differential image between said  
10 inspection image and said reference image on the basis of said transfer characteristics, to  
perform an inspection on the basis of said enhanced differential image.
2. The defect inspection apparatus according to claim 1, wherein  
said operation part converts said inspection image and said reference image on  
15 the basis of said transfer characteristics to obtain a differential image between a converted  
inspection image and a converted reference image as said enhanced differential image.
3. The defect inspection apparatus according to claim 1, wherein  
said transfer characteristics is determined on the basis of pixel values of said  
20 inspection image or said reference image.
4. The defect inspection apparatus according to claim 3, wherein  
said plurality of specified pixel values are positioned between representative  
pixel values corresponding to two regions in said inspection image or said reference  
25 image.

5. The defect inspection apparatus according to claim 4, wherein  
each of said representative pixel values is an average value of values of pixels  
belonging to a region.

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6. The defect inspection apparatus according to claim 3, wherein  
said plurality of specified pixel values are positioned outside a pixel value range  
corresponding to a specific region in said inspection image or said reference image.

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7. The defect inspection apparatus according to claim 6, wherein  
said pixel value range corresponding to said specific region is set on the basis of  
a standard deviation of values of pixels belonging to said specific region.

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8. The defect inspection apparatus according to claim 1, wherein  
said operation part sets a specified pixel value range including said plurality of  
specified pixel values.

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9. The defect inspection apparatus according to claim 1, further comprising  
an input part for receiving an input of a specified pixel value range including  
said plurality of specified pixel values.

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10. The defect inspection apparatus according to claim 1, wherein  
said transfer characteristics include inspection image transfer characteristics  
obtained from said inspection image and reference image transfer characteristics obtained  
from said reference image.

11. The defect inspection apparatus according to claim 1, wherein  
said operation part synthesizes a differential image between said inspection  
image and said reference image and said enhanced differential image and compares  
5 values of pixels in a synthesized image with a predetermined threshold value, to perform  
inspection.

12. The defect inspection apparatus according to claim 1, wherein  
each of a plurality of images which are obtained by dividing an image acquired  
10 by said image pickup part is said inspection image.

13. A defect inspection method for inspecting pattern on an object, comprising  
the steps of:  
a) preparing data of a reference image;  
15 b) performing an image pickup of an object to acquire data of an inspection  
image which is multitone;  
c) obtaining transfer characteristics to enhance difference between arbitrary  
pixels among a plurality of specified pixel values which are specified in defect detection;  
d) obtaining an enhanced differential image between said inspection image and  
20 said reference image on the basis of said transfer characteristics; and  
e) performing inspection on the basis of said enhanced differential image.

14. The defect inspection method according to claim 13, wherein  
said inspection image and said reference image are converted on the basis of said  
25 transfer characteristics to obtain a differential image between a converted inspection

image and a converted reference image as said enhanced differential image in said step d).

15. The defect inspection method according to claim 13, wherein  
said transfer characteristics is set on the basis of pixel values of said inspection  
5 image or said reference image in said step c).

16. The defect inspection method according to claim 15, wherein  
said plurality of specified pixel values are positioned between representative  
pixel values corresponding to two regions in said inspection image or said reference  
10 image.

17. The defect inspection method according to claim 16, wherein  
each of said representative pixel values is an average value of values of pixels  
belonging to a region.

18. The defect inspection method according to claim 15, wherein  
said plurality of specified pixel values are positioned outside a pixel value range  
corresponding to a specific region in said inspection image or said reference image.

19. The defect inspection method according to claim 18, wherein  
said pixel value range corresponding to said specific region is set on the basis of  
a standard deviation of values of pixels belonging to said specific region.

20. The defect inspection method according to claim 13, further comprising the  
25 step of:

setting a specified pixel value range including said plurality of specified pixel values before said step c).

21. The defect inspection method according to claim 13, wherein  
5        said transfer characteristics include inspection image transfer characteristics obtained from said inspection image and reference image transfer characteristics obtained from said reference image.

22. The defect inspection method according to claim 13, wherein  
10        said step e) comprises the steps of:  
         synthesizing a differential image between said inspection image and said reference image and said enhanced differential image; and  
         comparing values of pixels in a synthesized image with a predetermined threshold value.

15        23. The defect inspection method according to claim 13, wherein  
         said step b) comprises the step of  
         dividing an image acquired by image pickup to obtain a plurality of inspection images.

20        24. A computer-readable recording medium carrying a program for executing inspection of pattern, wherein execution of said program by a computer causes said computer to perform the steps of:

         a) preparing data of a reference image;  
25        b) preparing data of an inspection image which is multitone;

c) obtaining transfer characteristics to enhance difference between arbitrary pixels among a plurality of specified pixel values which are specified in defect detection;

d) obtaining an enhanced differential image between said inspection image and said reference image on the basis of said transfer characteristics; and

5 e) performing inspection on the basis of said enhanced differential image.